



Traveler 9.0.1 High Availability Setup and Best Practice

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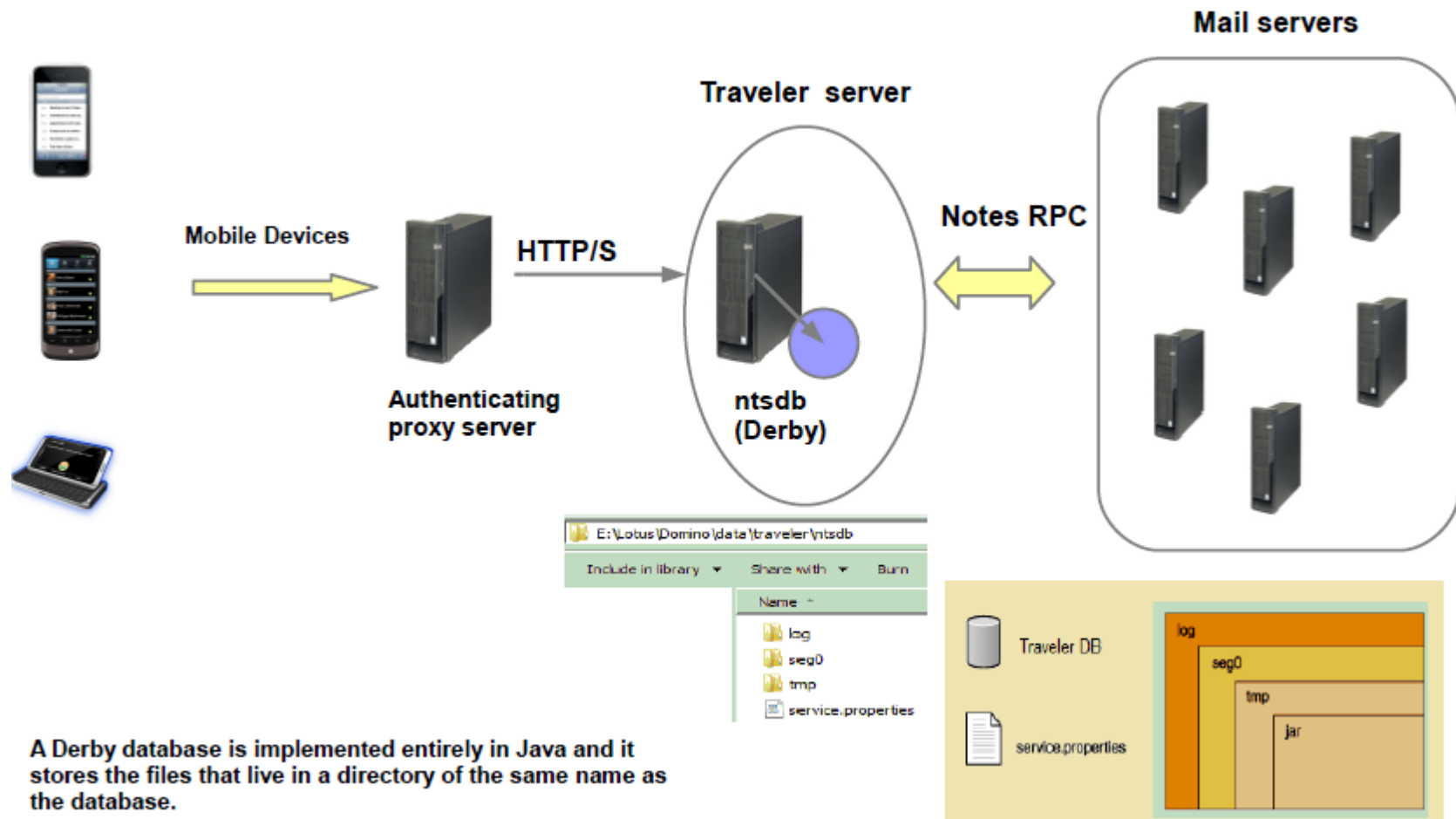
IBM ICS Software Engineer



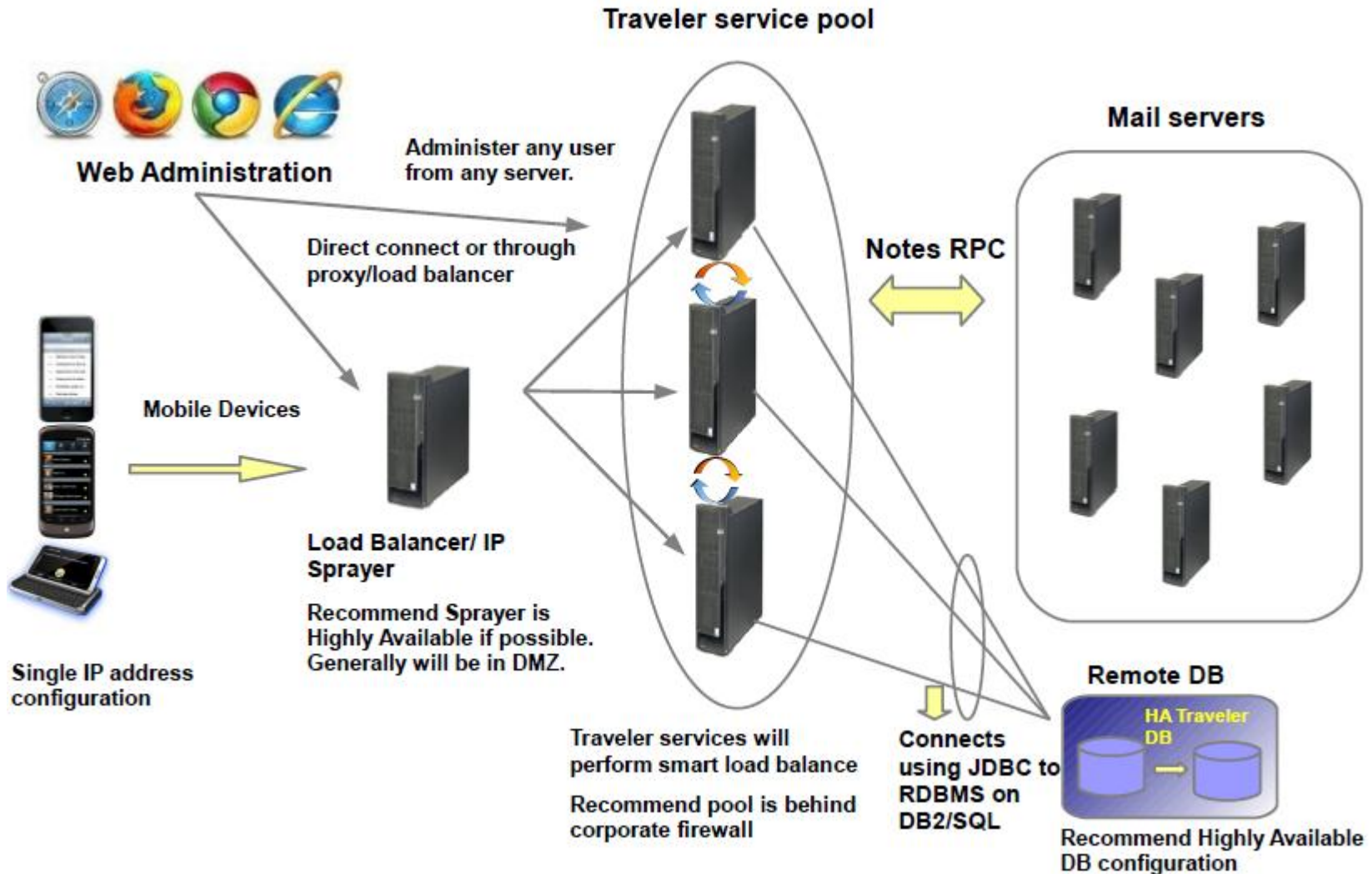
Agenda

- **Lotus Notes Traveler 9.0.1 Overview and System Requirements**
 - **Traveler Architecture Overview**
 - Highly Available(HA) Consideration
 - 1) Load balancing
 - 2) Failover
 - System Requirement
- Deployment checklist for HA
 - Initial infrastructure setup
 - Setup for individual servers
 - Best practices for HA
- Reference

Overview-Basic Traveler Architecture without HA

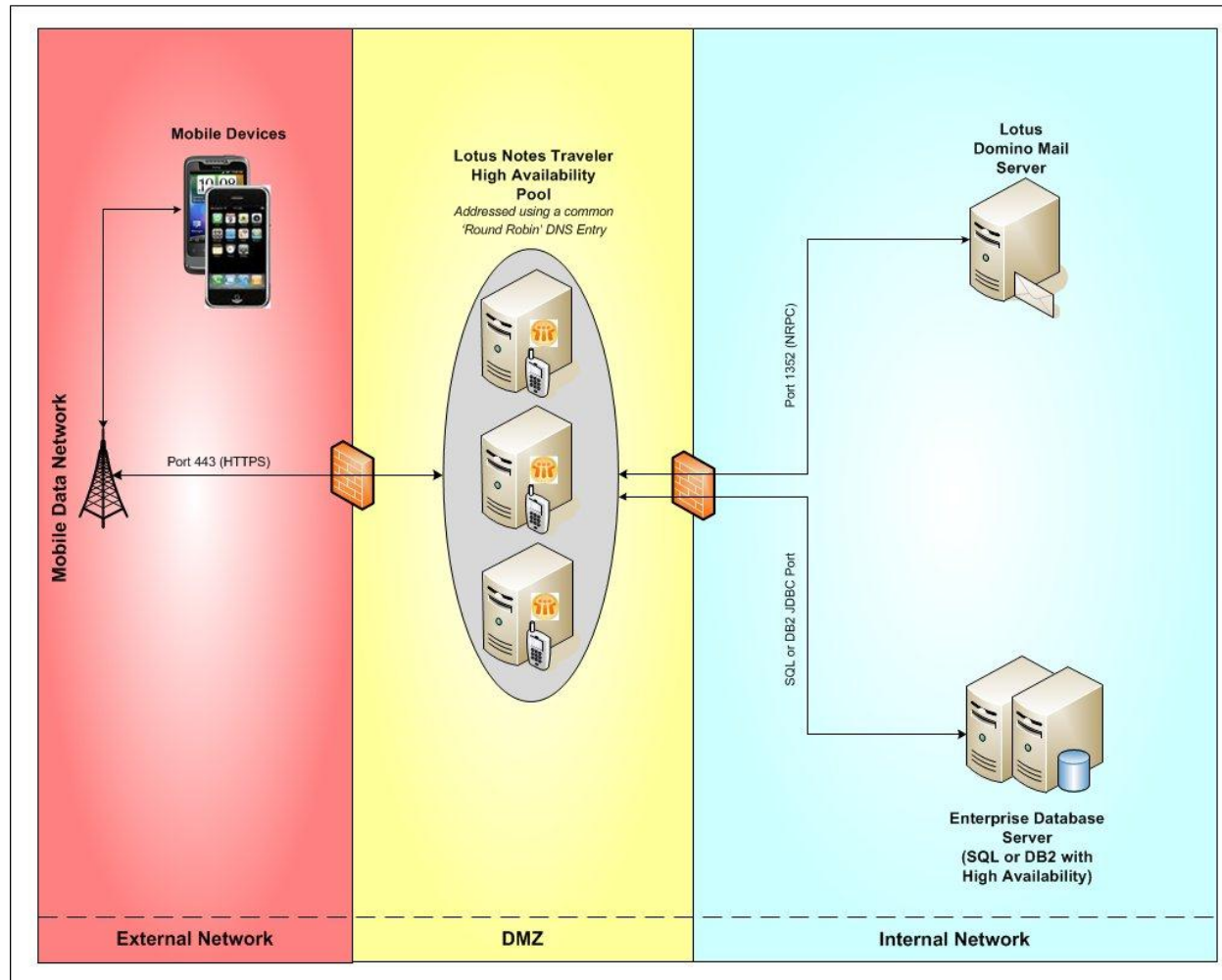


Overview-HA architecture



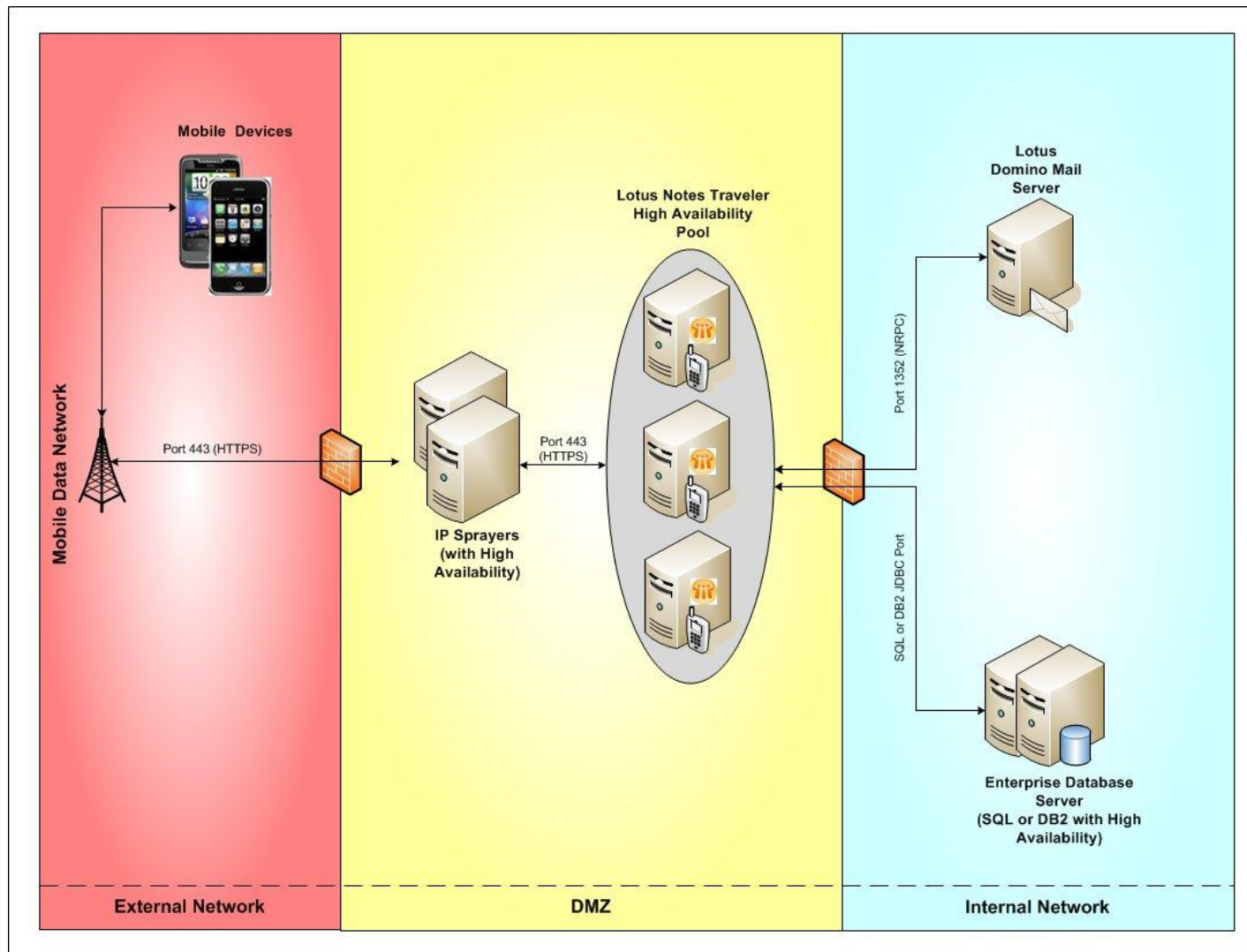
Overview- Planning network topology for HA

- Option one: A direct connection solution
- Lotus Notes Traveler direct connection with HA via round robin DNS



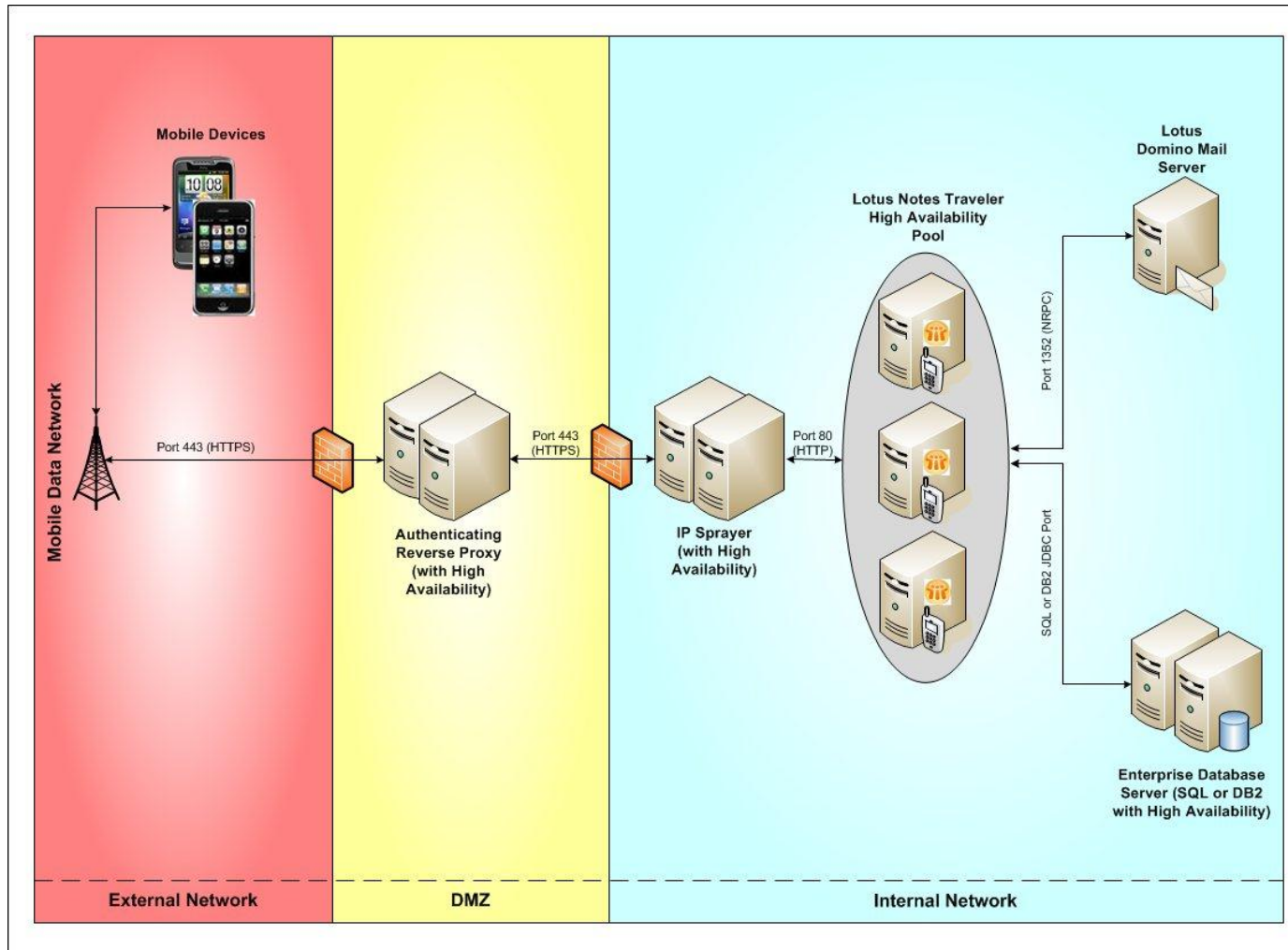
Option one: A direct connection solution

- Lotus Notes Traveler direct connection with HA using an IP sprayer



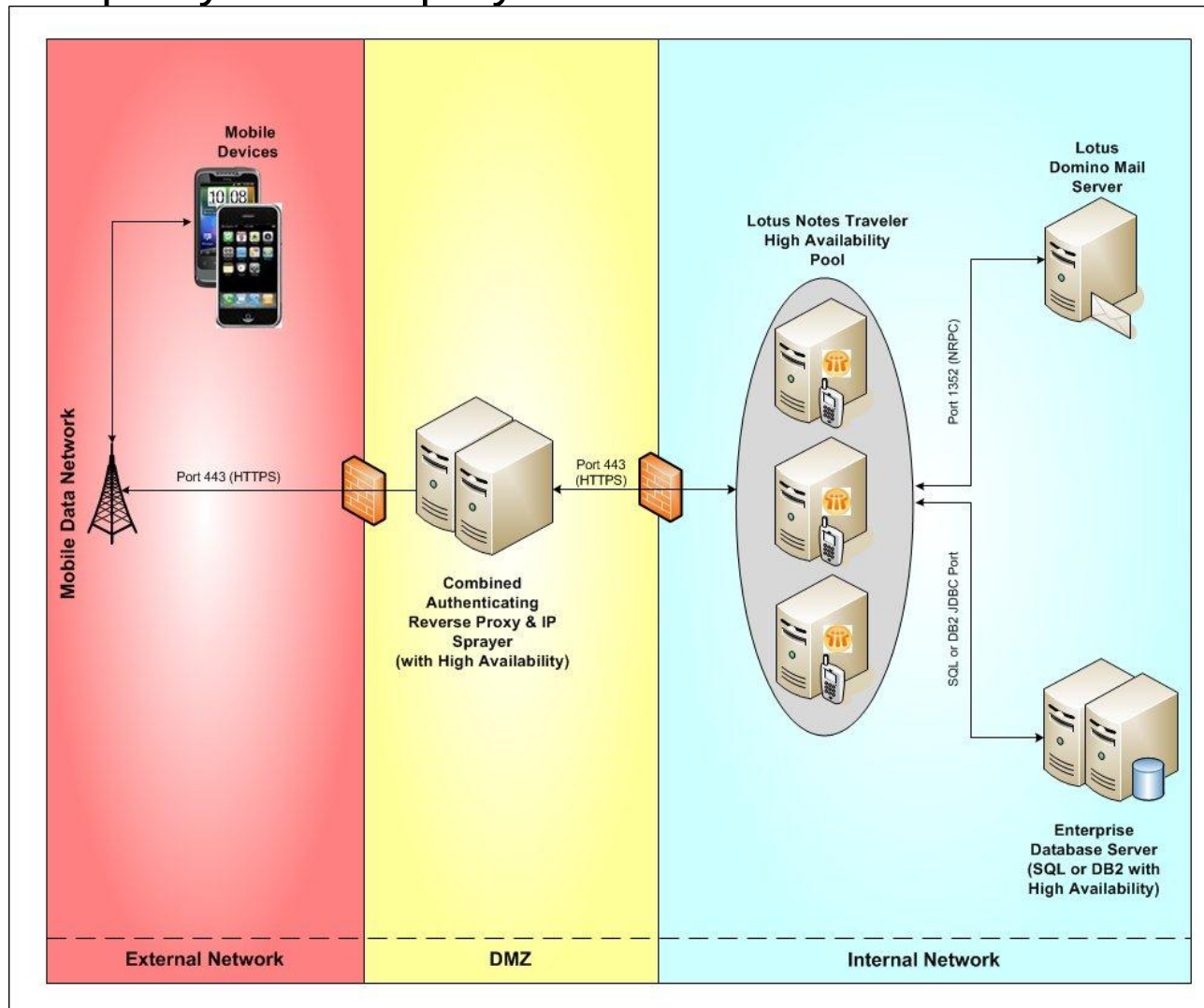
Option two: A reverse proxy solution

- Lotus Notes Traveler reverse proxy connection with HA using a separate IP sprayer



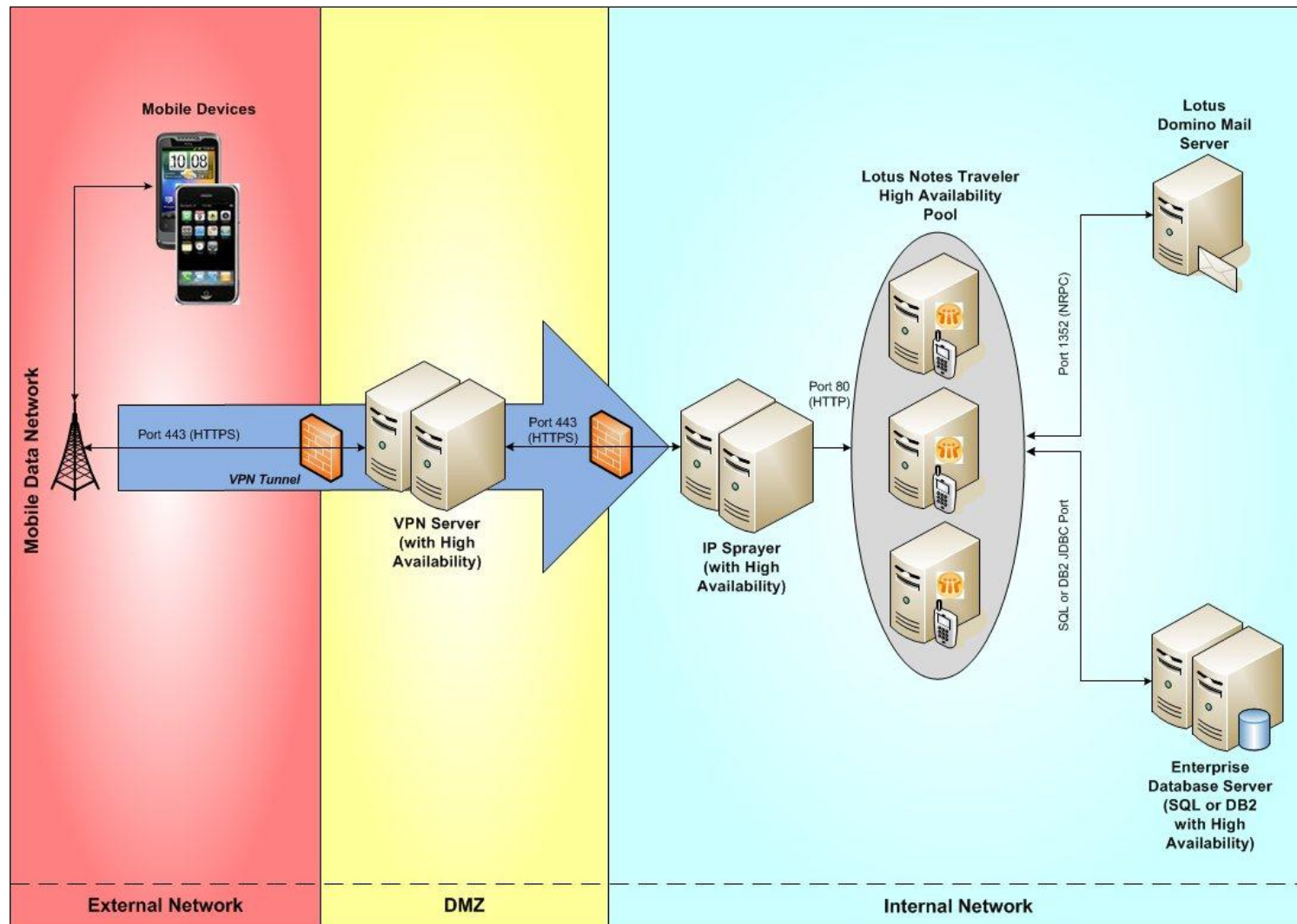
Option two: A reverse proxy solution

- Lotus Notes Traveler reverse proxy connection with HA using combined proxy and IP sprayer



Option three: A virtual private network solution

- Lotus Notes Traveler using a VPN connection with HA





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HA Consideration – Load Balancing

■ IP sprayer/Load balancer:

When considering the function of network load balancing, it is important to keep in mind that the Lotus Notes Traveler servers will be providing their own load balancing, independent of what the front end IP sprayer/Load balancer does.

The minimal requirements for an IP sprayer/load balancer include:

- Provides a single URL and supports the proxy of device requests to two or more Lotus Notes Traveler servers.
- Round robin load balancing to spread the load evenly across the Lotus Domino HTTP tasks as desired.
- The ability to detect when a Lotus Notes Traveler server is no longer responding (to allow for failover).
- Session affinity for a device session is not required but is recommended for efficiency. A short timeout of less than 2 hours is recommended



HA Consideration – Load Balancing

■ Traveler server load balancing

➤ Traveler load balancing terminology:

- Availability index

The Availability Index (AI) is simply the percent available to a server, and is based on current CPU and memory usage. The value is generally 0-100%, but can be negative if the server is over loaded or has been classified as unavailable.

- Master monitor

The server responsible for processing user data. Each user is assigned a master monitor the first time his/her device connects. Master Monitor is changed as needed to maintain load balance (For example, If no device connects, the master monitor assignment will expire after 24 hours)

- Availability index bias

A bias or weighting is used to improve performance when deciding which server should be the master monitor for a particular user. The two types of bias are local server (10%) and current master monitor (20%).

HA Consideration – Load Balancing

■ Traveler server load balancing

The algorithm used to balance traffic across Lotus Notes Traveler servers is: For each request from the device, the local server will determine the best server to handle the request by comparing the AIs of each server. The following table shows examples of Lotus Notes Traveler load balancing.

To prevent thrashing, a user's master monitor can not be switched again for at least 10 minutes

Server 1 (Local Server) Bias = 10%		Server 2 No bias		Server 3 (Master Monitor) Bias = 20%		Load balance winner and master monitor
Current AI	AI + Bias	Current AI	AI + Bias	Current AI	AI + Bias	
90	100	90	90	90	110	Server 3
70	80	90	90	50	70	Server 2
85	95	90	90	70	90	Server 1

HA Consideration – Load Balancing

■ Traveler server load balancing

Notes.ini parameters can be used to adjust the algorithm above. It is recommended to only change these values in small increments and monitor the systems for performance changes. In general, the default values should be sufficient.

Setting	Default value	Description
NTS_ROUTE_BIND_H OLD_TIME	60000 (milliseconds)	Minimum time required before a particular user's master monitor can be moved once assigned.
NTS_ROUTE_LOCAL_ BIAS	10 (Percent)	Bias added to the local server's AI.
NTS_ROUTE_CURRE NT_BIAS	20 (Percent)	Bias added to the current master monitor server's AI.



HA Consideration – Failover

- IP sprayer/Load balancer with HA to failover when one server doesn't response
- Traveler server Failover:
 - If traveler server in HA pool is no longer responding (crash/hang), the IP sprayer/Load balancer will detect it and failover the request to other traveler servers.
 - If the traveler server in HA pool still can accept request, but is extreme slow, the traveler server will redirect the request to other servers in the pool.
- IBM DB2 High Availability (HADR):
 - If the primary DB2 server is responding, but is extreme slow, the primary DB2 server should failover requests to alternate server according to the failover algorithm configured inside DB2
 - If the primary DB2 server is no longer responding, the traveler server will detect it and failover the request to alternate server utilize “automatic client reroute” in the travelerUtil db set command



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Traveler 9.0.1 System Requirements for High Availability

- Minimum system requirements for IBM Notes Traveler 9:

<http://www-304.ibm.com/support/docview.wss?uid=swg27038193>

- IP sprayer support has been tested with but not limited to the following:
 - IBM Mobile Connect v6.1.5
 - Apache HTTP Server v2.2.22
 - WebSphere Edge Server v7.0.0.18
- DB2 Enterprise Database Requirements
 - DB2 Enterprise/ Workgroup Server Edition v9.7 fixpack 5 and higher level fixpacks
 - DB2 Enterprise/ Workgroup Server Edition v10.1 and higher level fixpacks
- Domino and Traveler must be at same major version.
- ALWAYS recommend 64 bit Domino server Domino.
- Can not upgrade Windows 2003, SUSE 10 or Redhat 5 systems



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Initial infrastructure setup

- Install a load balancer / IP sprayer
- Install a DB2 Enterprise/ Workgroup Server
- Create the IBM Notes Traveler database:
 - Automatic Way:
Configure DB2 database for Traveler using the DB2 Configuration Wizard
 - Manual/ Data Definition Language (DDL) Way:
Configure DB2 database for Traveler using DDL

Note: The recommended version is DB2 Enterprise Server Edition 10.1.

Control Center tools such as wizards are discontinued since DB2 10.1

http://www-10.lotus.com/ldd/dominowiki.nsf/dx/Deploying_and_configuring_the_enterprise_database_A9



Initial infrastructure setup-Install a load balancer / IP sprayer

- Deploy the front end load balancer/IP sprayer:

http://www-10.lotus.com/ldd/dominowiki.nsf/dx/Deploy_an_IP_sprayer_or_load_balancer_A9

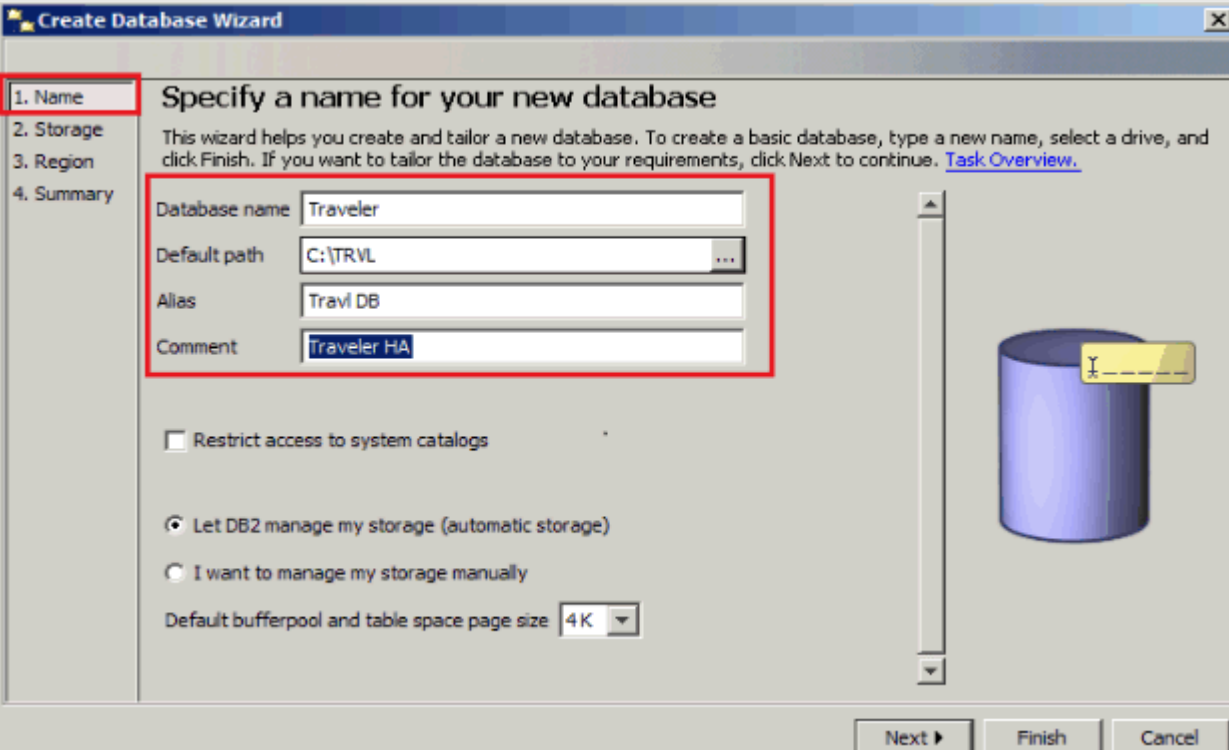
- Update your firewall(s) or other network equipment to support the "sprayer to server" and "server to database" connections:

http://www-10.lotus.com/ldd/dominowiki.nsf/dx/Planning_your_network_topology_A9

Note: You only need to perform steps in "Initial infrastructure setup" once

Create Traveler database - using the DB2 Configuration Wizard

- To create DB2 database for traveler using the DB2 Configuration Wizard, perform the following procedure:
 1. Launch the DB2 Control Center from System tray or Start menu
 2. Select Create Database > Standard.
 3. In the Create Database Wizard, select the defaults for each attribute unless otherwise noted. Fill in the Database name.



The screenshot shows the 'Create Database Wizard' window. The '1. Name' step is selected in the left sidebar. The main area is titled 'Specify a name for your new database'. It contains a text box for 'Database name' with the value 'Traveler', a 'Default path' text box with 'C:\TRVL', an 'Alias' text box with 'Travl DB', and a 'Comment' text box with 'Traveler HA'. Below these are three radio buttons: 'Restrict access to system catalogs' (unchecked), 'Let DB2 manage my storage (automatic storage)' (selected), and 'I want to manage my storage manually' (unchecked). A 'Default bufferpool and table space page size' dropdown is set to '4K'. A 3D cylinder icon represents the database. At the bottom are 'Next', 'Finish', and 'Cancel' buttons.

1. Name
2. Storage
3. Region
4. Summary

Specify a name for your new database

This wizard helps you create and tailor a new database. To create a basic database, type a new name, select a drive, and click Finish. If you want to tailor the database to your requirements, click Next to continue. [Task Overview.](#)

Database name: Traveler
Default path: C:\TRVL
Alias: Travl DB
Comment: Traveler HA

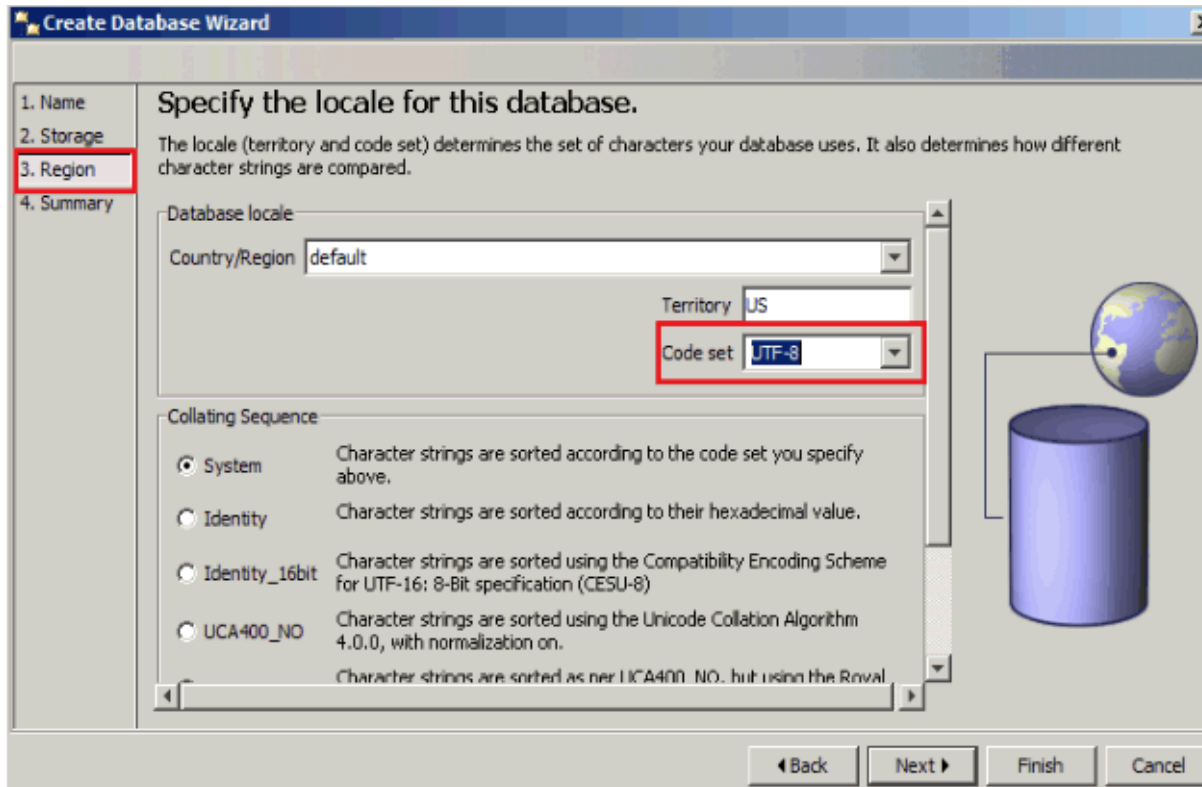
☐ Restrict access to system catalogs
☒ Let DB2 manage my storage (automatic storage)
☐ I want to manage my storage manually

Default bufferpool and table space page size: 4K

Next Finish Cancel

Continued.

4. Change the Code Set dialog box to UTF-8.



5. Click through the rest of the wizard and select Finish to create the IBM Notes Traveler database.

- Note: No tables need to be created in this database. All of the tables will be created by the first Lotus Notes Traveler server to be added to the database.



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Setup for individual servers

Complete the following setup steps for **each** IBM Notes Traveler server to be added to the HA pool:

- Install Domino server and validate its functionality.
All Domino servers in the HA pool should be in the same Domino domain.
- Install Traveler and validate its functionality.
- **Configure Traveler to use the enterprise database server and validate its functionality.**
- Update the front end sprayer to include the new Traveler server in the load balancing/sprayer configuration.
- Update the external URL setting for the server to point to the front end sprayer.

Note: This step is not required on each server if you enable common configuration for all IBM Notes Traveler servers in the pool.

Configure Traveler to use the enterprise database server

- **Configure Lotus Notes Traveler for enterprise DB2 database**

1) Ensure that the Lotus Notes Traveler DB is created and available on the DB2 server, We created the database in the previous steps.

2) On the DB2 server locate the file **db2jcc4.jar** in (<db2_install_dir>\sqllib\java\)

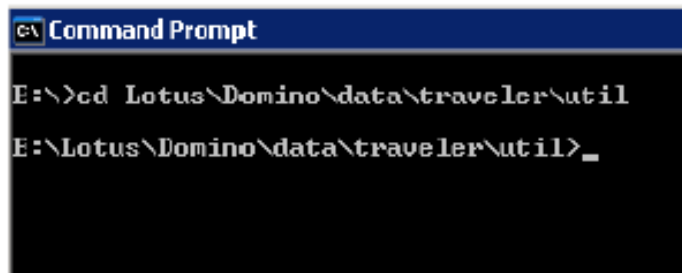
3) Copy the **db2jcc4.jar** from the **DB2** server to the **Lotus Notes Traveler** server in the below directory

<domino>\Traveler\lib

e.g **E:\Lotus\Domino\Traveler\lib**

4) Open a **command prompt (cmd)** on the Lotus Notes Traveler server and change the directory to **<domino data>\traveler\util**

e.g **E:\Lotus\Domino\Data\traveler\util**



```
C:\ Command Prompt
E:\>cd Lotus\Domino\data\traveler\util
E:\Lotus\Domino\data\traveler\util>_
```

Note: On Windows™ run **travelerUtil** commands as **administrator** & on Linux™ run the commands as the **root** user

Continued.

- **Configure Lotus Notes Traveler for enterprise DB2 database**

5) Run **travelerUtil** to configure Lotus Notes Traveler in the following format:

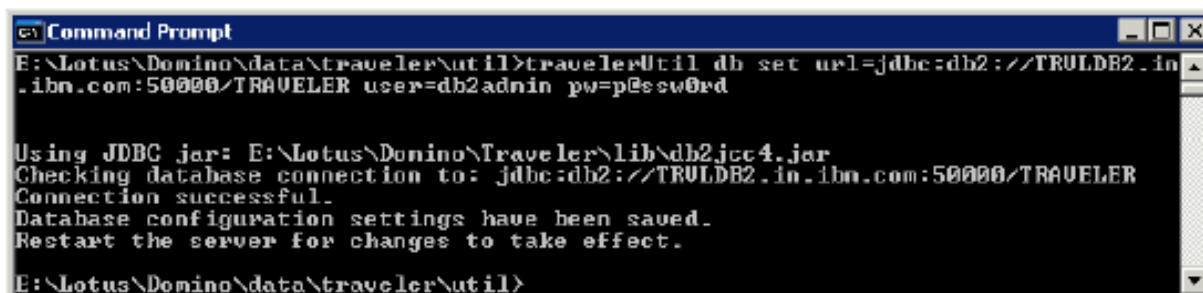
```
travelerUtil db set url=jdbc:db2://<db2server hostname>:<db port>/<traveler db name>  
user=<db2 admin id> pw=<db2 password>
```

The URL for DB2 consists of

- Hostname of the DB2 server
- Port number of database instant (Default port is **50000**)
- Database name and user name, password of DB2 server

E.g `travelerUtil db set url=jdbc:db2://TRVLDB2.in.ibm.com:50000/TRAVELER
user=db2admin pw=p@ssw0rd`

Utility validates the DB2 information and configures Lotus Notes Traveler to use the DB2 instance instead of derby database. The credentials are encrypted and stored in the LotusTraveler.nsf

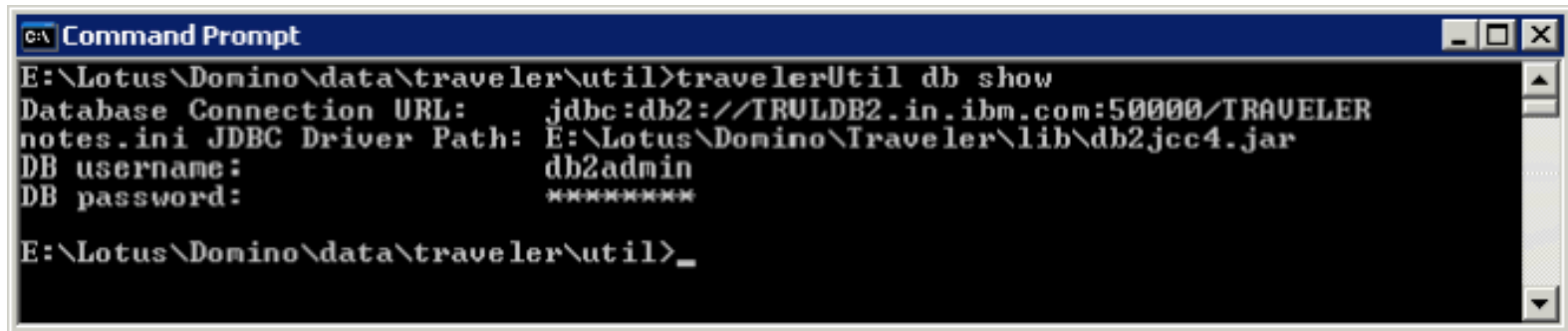


```
Command Prompt  
E:\Lotus\Domino\data\traveler\util>travelerUtil db set url=jdbc:db2://TRVLDB2.in  
.ibm.com:50000/TRAVELER user=db2admin pw=p@ssw0rd  
  
Using JDBC jar: E:\Lotus\Domino\Traveler\lib\db2jcc4.jar  
Checking database connection to: jdbc:db2://TRVLDB2.in.ibm.com:50000/TRAVELER  
Connection successful.  
Database configuration settings have been saved.  
Restart the server for changes to take effect.  
E:\Lotus\Domino\data\traveler\util>
```

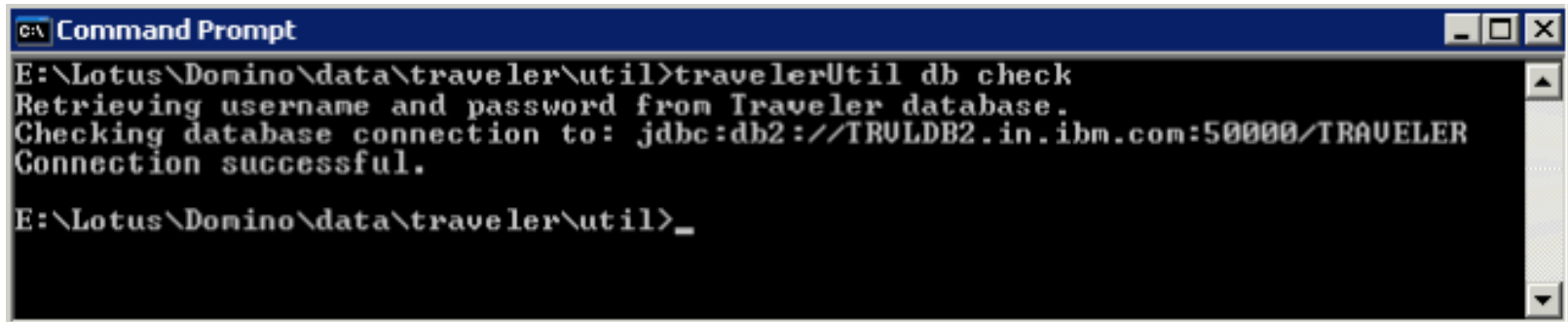
Continued..

- **Configure Lotus Notes Traveler for enterprise DB2 database**

6) To validate what you just configured, use the travelerUtil “db show” command or the travelerUtil “db check”, as shown below.



```
C:\> Command Prompt
E:\Lotus\Domino\data\traveler\util>travelerUtil db show
Database Connection URL:      jdbc:db2://TRULDB2.in.ibm.com:50000/TRAVELER
notes.ini JDBC Driver Path:  E:\Lotus\Domino\Traveler\lib\db2jcc4.jar
DB username:                  db2admin
DB password:                  ****
E:\Lotus\Domino\data\traveler\util>_
```



```
C:\> Command Prompt
E:\Lotus\Domino\data\traveler\util>travelerUtil db check
Retrieving username and password from Traveler database.
Checking database connection to: jdbc:db2://TRULDB2.in.ibm.com:50000/TRAVELER
Connection successful.
E:\Lotus\Domino\data\traveler\util>_
```

Continued...

- **Configure Lotus Notes Traveler for enterprise DB2 database**

- 7) Start IBM Notes Traveler

Note: Traveler will automatically create the database schema and database objects needed during startup of the first traveler server; existing users sync data will be transferred to HADR during start up of each traveler server.

```
08/06/2012 09:37:57 PM Lotus Traveler: Starting JVM with Maximum Memory = 3072M
08/06/2012 09:37:59 PM Lotus Traveler: Server starting...
08/06/2012 09:38:11 PM Lotus Traveler: Traveler will now transfer the existing users into the HADR Pool
08/06/2012 09:38:11 PM Lotus Traveler: 0/954 Users' Sync Data have been transferred
08/06/2012 09:38:47 PM Lotus Traveler: 16/954 Users' Sync Data have been transferred
08/06/2012 09:39:54 PM Lotus Traveler: 123/954 Users' Sync Data have been transferred
08/06/2012 09:43:09 PM Lotus Traveler: 293/954 Users' Sync Data have been transferred
.
08/06/2012 09:50:49 PM Lotus Traveler: 734/954 Users' Sync Data have been transferred
08/06/2012 09:51:55 PM Lotus Traveler: 791/954 Users' Sync Data have been transferred
.
08/06/2012 09:59:45 PM Lotus Traveler: 200 users remaining.
.
08/06/2012 10:03:45 PM Lotus Traveler: 90 users remaining.
08/06/2012 10:04:46 PM Lotus Traveler: 63 users remaining.
.
08/06/2012 10:07:46 PM Lotus Traveler: 18 users remaining.
08/06/2012 10:08:46 PM Lotus Traveler: 7 users remaining.
08/06/2012 10:09:46 PM Lotus Traveler: 3 users remaining.
08/06/2012 10:10:46 PM Lotus Traveler: 1 users remaining.
08/06/2012 10:11:46 PM Lotus Traveler: 1 users remaining.
08/06/2012 10:12:48 PM Lotus Traveler: Transfer has completed successfully. Traveler will now start in HADR mode.
08/06/2012 10:13:02 PM Lotus Traveler: Adding Client Installation Files (8.5.3.2.201205282100) to Database.
08/06/2012 10:13:02 PM Lotus Traveler: Adding Client Installation Files (8.5.3.2.201205282100) to Database.
.
08/06/2012 10:13:02 PM Lotus Traveler: Adding Client Installation Files (8.5.3.2.201205282100) to Database.
08/06/2012 10:13:02 PM Lotus Traveler: Adding Client Installation Files (8.5.3.2.201205282100) to Database.
08/06/2012 10:13:28 PM Lotus Traveler: Restarting HTTP Server for configuration changes.
RESTART TASK HTTP >C:\Windows\TEMP\notes0979B1\rem13346.com
08/06/2012 10:13:28 PM HTTP Server: Using Web Configuration View
08/06/2012 10:13:29 PM Lotus Traveler: Server started
08/06/2012 10:13:32 PM JVM: Java Virtual Machine initialized.
08/06/2012 10:13:32 PM HTTP Server: Java Virtual Machine loaded
08/06/2012 10:13:32 PM Servlet engine initialization was successful
08/06/2012 10:13:35 PM XSP Command Manager initialized
08/06/2012 10:13:59 PM HTTP Server: Started
```



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Best practices for HA

- The minimum configuration for a IBM Notes Traveler HA Pool is as follows:
 - Two Domino servers running IBM Notes Traveler
 - One DB2 server or Microsoft SQL server
 - One server running the IP sprayer/load balancer
- Derby to Enterprise DB Migration
 - IMPORTANT – only add one server to the pool at a time.
 - First server creates the pool and establishes default settings.
 - On startup will migrate user data to enterprise db – may take over an hour
 - Allow data migration to complete before adding another server.
 - Use DNS or Proxy routing to prevent need for reconfigure of the device for a new access URL.
 - Can add 32 bit server to the pool to migrate data, but should then retire the system.



Continued.

- The following setup considerations are optional but recommended:

- 1) Set up the server pool to share configuration information.
- 2) Set up and configure the enterprise database to be highly available.
- 3) Set up and configure the front end sprayer to be highly available.
- 4) Mail servers is recommended to be clustered.

Note: There will be a performance impact to enabling secure sockets for server to server communications. Depending upon your network configuration, this step may not be required.



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- Set up and configure the enterprise database to be highly available

Lotus Notes Traveler 9 included a limited entitlement to IBM DB2 Workgroup for Linux, UNIX, and Windows. This limited entitlement is provided for customers who want to deploy a Lotus Notes Traveler High Availability server but do not already have a relational database management system. The DB2 entitlement is to be used to support Lotus Notes Traveler and not for any other purpose.

For more information about DB2 installation, configuration, and high availability setup, see the IBM Redbooks publications:

DB2 Deployment Guide:

<http://www.redbooks.ibm.com/abstracts/sg247653.html>

High Availability and Disaster Recovery Options for DB2 on Linux, UNIX, and Windows:

<http://www.redbooks.ibm.com/abstracts/sg247363.html>

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- **Traveler use the highly available enterprise database**

A capability called Automatic Client Reroute is provided on traveler to support the use of IBM DB2 High Availability (HADR). For DB2 for Linux, UNIX, and Windows, the JDBC URL to utilize automatic client reroute in the travelerUtil db set command would look like the following:

```
travelerUtil db set url=jdbc:db2://primaryDBbserver.yourco.com:50000/TRAVELER:  
clientRerouteAlternateServerName=alternateDBserver.yourco.com;clientRerouteAlternat  
ePortNumber=50000;retryIntervalForClientReroute=10;maxRetriesForClientReroute=3;  
user=db2admin pw=passw0rd
```



Continued....

- Avoid network latency between servers

- Lotus Notes Traveler servers in an HA pool should all be located on the same network.
- If failover is configured for the database servers, the database servers should be located within the same network, preferably on the same switch.

In general, the Lotus Notes Traveler HA pool and the database servers should be co-located in the same data center or have lower latency, higher speed network.

- Avoid single points of failure

- Each component of the traveler HA topology use a dedicated server



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- Size the servers in the HA pool such that there is spare capacity to handle failover.
 - rounded up (devices/ a server capacity) to an integer plus 1 more for fail-over
- For example, assume a server capacity of 2000 devices and a total population of 4000 devices. A two server pool will not be adequate, as one server cannot handle 4000 devices in the event the other server is taken offline. Therefore, to adequately handle the device load in the event of one server going offline, three servers are required.

- NOT necessary to upgrade the template of the Domino directory.

Potential issue is some Traveler settings may not be available if using Domino Policy documents from an older names.nsf templates

Defragment the stand-alone database prior to migration. For more information, refer to Defragmenting the internal database for improved performance.

Web Based Administration

- `http(s)://hostname/LotusTraveler.nsf`
- Supports all traditional administration functionality, plus a few enhancements.
- Can still access LotusTraveler.nsf with Admin/Notes client in stand-alone mode.
- Web Admin only for HA mode - will get this message accessing with Notes/Admin client:

Lotus Notes Traveler Administration

The selected view is obsolete for Lotus Notes Traveler.

Lotus Notes Traveler administration has changed to an XPages application that can be accessed from your browser via the link [//<traveler_server_name>/LotusTraveler.nsf](http://<traveler_server_name>/LotusTraveler.nsf).

For more information about Lotus Notes Traveler and its Administration see [Administering Lotus Notes Traveler](#).

Tell Commands in HA Environment

- User based commands are HA aware
 - Commands such as show, dump, delete, reset, stopsync get routed to the users master monitor server.
 - Console messages will report which server the command was routed to.
 - Console output will be routed back to the server the command was issued.
 - User dump file will be generated on the Master Monitor server and not the server the command was issued.
- Server based commands operate locally by default, such as log collect, pmr, systemdump, status,etc
 - Use -s <server> option to route to a specific server. For example:
tell traveler -s "myserver/myco" status
tell traveler -s * pmr 12345,678,900
- New HADR command for viewing servers in the pool.
- New Available command to mark a system as unavailable – useful for testing.

Logging in HA Environment

- Log location is local only – set in notes.ini
- All other log settings are global and should be set using tell commands.

```
tell traveler log level finest  
tell traveler log adduser finest username  
tell traveler log fields *
```

- Log level is always finest during startup, then switches to defined level.
- log collect, log clear, systemdump and pmr commands all run locally, use -s to run on other servers.

```
tell traveler -s * systemdump  
tell traveler -s * pmr 12345,999,744  
tell traveler -s myserver/myco log collect
```

- For complete list of options:

```
tell traveler log help
```



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- IBM Redbooks: IBM Notes Traveler hints and tips for a successful deployment:

<http://www-10.lotus.com/ldd/dominowiki.nsf/xpViewCategories.xsp?lookupName=IBM%20Redbooks:%20IBM%20Notes%20Traveler%20hints%20and%20tips%20for%20a%20successful%20deployment>

- Lotus Notes Traveler Product Documentation

<http://www.lotus.com/ldd/dominowiki.nsf/xpViewCategories.xsp?lookupName=Product%20Documentation>

- Lotus Traveler Support FAQ

<http://www.ibm.com/support/docview.wss?uid=swg21450615>

- Lotus Traveler Releases by Date

http://www.lotus.com/ldd/dominowiki.nsf/dx/Lotus_Notes_Traveler_APAR_listing

- Check list of the process to deploy a High Availability pool

http://www-10.lotus.com/ldd/dominowiki.nsf/dx/Deployment_checklist_for_HA_A9

- Configuring Traveler HA using DB2

http://www-10.lotus.com/ldd/dominowiki.nsf/dx/Configuring_IBM_Lotus_Notes_Traveler_High_Availability_with_an_enterprise_IBM_DB2_database

Continued.

- Setup for common configuration

http://www-10.lotus.com/ldd/dominowiki.nsf/dx/Setup_for_common_configuration_optional_A9

- Configure IBM Notes Traveler to use the enterprise database

http://www-10.lotus.com/ldd/dominowiki.nsf/dx/Configuring_IBM_Notes_Traveler_for_enterprise_database_A9

- Upgrade considerations for HA

http://www-10.lotus.com/ldd/dominowiki.nsf/dx/Upgrade_considerations_for_a_Highly_Available_environment_A901?OpenDocument&sa=true

- Notes Traveler Support Community

<http://w3.ibm.com/connections/communities/service/html/communityview?communityUuid=6cdeca04-36b9-441b-a27a-a82c1eb05a4a>

- Notes Traveler Performance Technote

<http://www.ibm.com/support/docview.wss?uid=swg21568658>

Q&A



多谢

Thank You

IBM 蓝色麦动技术交流讲座资料下载:

URL: <http://www-01.ibm.com/software/cn/passportadvantage/support.html>

